



Saskatchewan
Prairie Conservation
Action Plan

Prairie's Got the Goods Week!

Presentation: Impacts of Industrial Disturbance on Soil Microbial and Plant Communities in Mixed Grass Prairies of Alberta

Grasslands provide significant ecosystem goods and services, such as carbon sequestration, the mitigation of greenhouse gases, and the provision of diverse habitats for animals, microorganisms, and pollinators. Disturbances to grasslands may decrease their ability to provide and maintain these goods and services. Significant areas of the mixed grass prairies (MGP) in Alberta have experienced industrial disturbance from high voltage powerline installation; heavy industrial equipment traffic during construction on prairie soils may directly impact vegetation, increase soil compaction and cause surface rutting, resulting in fluctuations in edaphic conditions that influence soil microbial and plant communities. These impacts may be alleviated through the use of access mats, which spread traffic impacts over a larger area; however, no scientific assessments of access mat efficacy have been conducted in northern temperate grasslands. Our objective was to assess the potential of access mats to decrease grassland disturbance due to industrial traffic exposure and promote subsequent grassland recovery.

Multiple sites on loamy and sandy soils were established in a randomized complete block design (RCBD) within MGP ecosystems at the University of Alberta Mattheis Research Ranch in SE Alberta. Mats were placed for three time durations (6, 12 and 24 weeks) in two seasons (spring and/or fall) during 2015 to test the effects of duration and timing of mat placement. Industrial traffic was applied to matted areas to simulate industrial activity, and these areas compared to non-disturbed plots in their effects on plant community composition and biomass after mat removal to assess initial vegetation recovery. Soil was sampled for microbial analyses in July 2015 and 2016 from two sites subjected to spring-applied 12-week access mats, direct-traffic, and non-disturbed plots; soil DNA was extracted and used to target microbial genes via qPCR.

Longer durations (12 and 24 wk) of access mat placement increased the cover of ruderal species the following year, while decreasing native perennial grass cover and total plant biomass. Access mats decreased soil compaction caused by traffic, and increased water infiltration rates and soil moisture. The sizes of targeted microbial populations were impacted by soil texture (site), soil moisture conditions, and in some cases the disturbance treatments applied. Results indicate that plant and specific soil microbial communities were impacted by the type of industrial disturbance. These changes may relate to ecosystem functioning of grassland recovering after industrial disturbance and have potential implications for the ecosystem goods and services these grasslands provide.



Tuesday March 14th, 2017 at 3:00pm CST
Presenter: Dr. Karen Thompson, University of Alberta

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